



CLEVELAND-CLIFFS INC.
Cleveland-Cliffs Minorca Mine Inc.
5950 Old Highway 53 N., Virginia, MN 55792
P 218.749.5910 clevelandcliffs.com

October 26, 2021

Regional Administrator
Air and Radiation Division
U.S. Environmental Protection Agency, Region 5 (A-18J)
77 West Jackson Boulevard
Chicago, IL 60604

**Re: Cleveland-Cliffs Inc. Minorca Mine
3rd Quarter 2021 Excess Emissions and Monitoring System Performance Reports
Federal Implementation Plan for Regional Haze (FIP)**

On behalf of Cleveland-Cliffs Inc. Minorca Mine (Minorca), I am submitting the enclosed Excess Emissions and Monitoring System Performance Reports for the 3rd quarter of 2021 as required by 40 CFR 52.1235(e)(7). It should be noted that while the continuous emissions monitoring requirements of the FIP were in effect in the reporting period, the emission limitation for NO_x is not yet applicable. 40 CFR 52.1235(b)(1)(v)(A) specifies that the NO_x limitation will become enforceable *"...55 months after May 12, 2016 and only after EPA's confirmation or modification of the emission limit..."*.

Minorca submitted a revision of the 38.16 lb SO₂/hr on a 30-day rolling average limit to U.S. EPA in accordance with 40 CFR 52.1235(b)(2)(v) on April 6, 2018. That section of the FIP provides that Minorca "may calculate a revised SO₂ limit based on one year of hourly CEMS emissions data reported in lbs SO₂/hr and submit such limit, calculations, and CEMS data to EPA." This provision to modify the SO₂ limit exists because EPA recognized that the initial SO₂ limit was based on "limited stack test data" (78 Fed. Reg. 8718) and did not reflect the variability of Minorca's operations. The revised emission limit calculation methodology follows the provisions of 40 CFR 52.1235(b)(2)(v) and results in an updated emission limit of 58.64 lbs SO₂/hr based on a 30-day rolling average (prior to adjusting to account for operating levels of the Minorca furnace which were less than capacity during the data collection period). Adjusting to reflect the emissions associated with operation of the furnace at capacity using the above equation results in a limit of 73.79 lbs SO₂/hr based on a 30-day rolling average. The revised limit became effective on the April 6, 2018 date of submittal of the limit revision package.

These reports were developed following the procedures and practices described in the Site Specific Monitoring Plan (SSMP) required by 40 CFR 52.1235(e)(8) and submitted to EPA on December 1, 2016.

Please contact Jaime Johnson, Minorca's Environmental Manager, at (218) 305-3337 should you have any questions or comments regarding this report.

Sincerely,

Robb Peterson
Operations Manager

Enclosed: 3rd Quarter 2021 Excess Emissions and Monitoring System Performance Reports
3rd Quarter 2021 RATA Summary Reports for SV 014-017, NO_x and SO₂

cc: Jaime Johnson (Cleveland-Cliffs Minorca Mine Inc.)
Scott Gischia (Cleveland-Cliffs Inc.)

Quarterly Excess Emissions and Monitoring System Performance Report

EU 026 Combined SO2 Emissions and Analyzer Downtime

From: 07/01/2021 00:00

Generated: 10/18/2021 10:44

To: 09/30/2021 23:59

Facility Name: Cleveland-Cliffs Minorca Mine

Location: 5950 Old Hwy 53, Virginia, MN

Description: Indurating Furnace (EU 026)



CMS Data from:

EDS Data from:

Emission Limitation:

Monitor Manufacturer, Model No., & Serial:

Date of Latest CMS Certification or Audit:

Operating time for EDS:

Operating time for CMS:

EU26_SO2_30D_LbPerHr_1D

EU26_SO2_30D_LbPerHr_1D

58.64 lb SO2/hr / 73.79 lb SO2/hr, 30-day rolling average. See Footnote [1].

See downtime reports for individual stacks.

See downtime reports for individual stacks.

81.38 Day(s)

81.38 Day(s)

Emission Data Summary		CMS Performance Summary	
1.	Duration of excess emission in reporting period due to:	1.	CMS downtime in reporting period due to:
	a. Startup/shutdown		a. Monitor equipment malfunctions
	b. Control equipment problems		b. Non-Monitor equipment malfunctions
	c. Process Problems		c. Quality assurance calibration
	d. Other known causes		d. Other known causes
	e. Unknown causes		e. Unknown causes
2.	Upset Conditions	2.	Total CMS Downtime
3.	Total Duration (Subtracts Exclusions and Upset Conditions)	3.	Total Downtime as a percentage of operating time
4.	Time of Excess Emission as a percentage of operating time	4.	Total Availability as a percentage of operating time
5.	Time in compliance as percentage of operating time		

[1] Minorca established the 58.64 lb SO2/hr on a 30-day rolling average basis limit via submittal of one year of CEMS data to the EPA on April 6, 2018 (prior to adjusting to account for operating levels of the Minorca furnace which were less than capacity during the data collection period). Adjusting to reflect the emissions associated with operation of the furnace at capacity using the above equation results in a limit of 73.79 lbs SO2/hr based on a 30-day rolling average.

There were no periods of excess emissions during this reporting period.

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

CMS downtime reported for EU026 SO2 monitoring includes all downtime from the SO2 concentration and Stack Flow analyzers installed on SV014, SV015, SV016, and SV017 if the minimum data availability required by 52.1235(c)(4)(viii)(C) are not met after the application of secondary data calculations used to determine "emission rates when CEMS data is not available due to downtime associated with QA/QC events" as required by 40 CFR 52.1235(e)(8)(iv). These calculations are described in detail within the site specific monitoring plan (SSMP) which was submitted to the EPA per the requirements of 40 CFR 52.1235(e)(8). Please refer to the downtime reports for the individual stack analyzers for details on their operation during the reporting period.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

EU 026 - Combined NOx Emissions and Monitor Downtime

From: 07/01/2021 00:00

Generated: 10/18/2021 10:44

To: 09/30/2021 23:59

Facility Name: Cleveland-Cliffs Minorca Mine Inc

Location: 5950 Old Hwy 53, Virginia, MN

Description: Indurating Furnace (EU 026)



CMS Data from:

EDS Data from:

Emission Limitation:

Monitor Manufacturer, Model No., & Serial:

Date of Latest CMS Certification or Audit:

Operating time for CMS:

EU26_NOx_30D_LbPerMBtu_1D

N/A

1.2 lb NOx/MMBtu, 30-day rolling average. Limit applies 55 months after May 12, 2016.

See downtime reports for individual

See downtime reports for individual

81.38 Day(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

As the emission limitation does not apply until 55 months after May 12, 2016 and US EPA acceptance of the limit proposed by Minorca. US EPA has not yet accepted the proposed limit. As such, there were no periods of NOx excess emissions during this reporting period.

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

CMS downtime reported for EU026 NOx monitoring includes all downtime from the NOx concentration and Stack Flow analyzers installed on SV014, SV015, SV016, and SV017 if the minimum data availability required by 52.1235(c)(4)(viii)(C) are not met after the application of secondary data calculations used to determine "emission rates when CEMS data is not available due to downtime associated with QA/QC events" as required by 40 CFR 52.1235(e)(8)(iv). These calculations are described in detail within the site specific monitoring plan (SSMP) which was submitted to the EPA per the requirements of 40 CFR 52.1235(e)(8). Please refer to the downtime reports for the individual stack analyzers for details on their operation during the reporting period.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV 014 Flow Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV14_StackFlow_scfh_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: Sic Flowsic, 100H, 13088519
Date of Latest CMS Certification or Audit: 7/28/2021 (via NOx RATA)
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV014 NOx Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV14_NOx_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T200H, 252
Date of Latest CMS Certification or Audit: 7/28/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary

1. CMS downtime in reporting period due to:
 - a. Monitor equipment malfunctions 1
 - b. Non-Monitor equipment malfunctions 0
 - c. Quality assurance calibration 0
 - d. Other known causes 0
 - e. Unknown causes 0
2. Total CMS Downtime 1
3. Total Downtime as a percentage of operating time 0.05
4. Total Availability as a percentage of operating time 99.95

Beginning Date and Time of Downtime	End Date and Time of Downtime	Duration of Downtime	Reason for Monitor Downtime	Corrective Action Taken
9/14/2021 22:00	9/14/2021 22:59	1 hr.	Monitor equipment malfunctions	Filter was changed and analyzer was returned to service.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV014 SO2 Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV14_SO2_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T100H, 143
Date of Latest CMS Certification or Audit: 7/28/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary

1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	1
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	1
3. Total Downtime as a percentage of operating time	0.05
4. Total Availability as a percentage of operating time	99.95

Beginning Date and Time of Downtime	End Date and Time of Downtime	Duration of Downtime	Reason for Monitor Downtime	Corrective Action Taken
9/14/2021 22:00	9/14/2021 22:59	1 hr.	Monitor equipment malfunctions	Filter was changed and analyzer was returned to service.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV15 Flow Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV15_StackFlow_scfh_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: Sic Flowsic, 100H, 13178539
Date of Latest CMS Certification or Audit: 7/29/2021 (via NOx RATA)
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary

1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	4
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	4
3. Total Downtime as a percentage of operating time	0.20
4. Total Availability as a percentage of operating time	99.80

Beginning Date and Time of Downtime	End Date and Time of Downtime	Duration of Downtime	Reason for Monitor Downtime	Corrective Action Taken
7/10/2021 8:00	7/10/2021 11:59	4 hours	Monitor equipment malfunctions	Failed plug in E-unit caused a water leak. Plug and wire were replaced.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV015 NOx Analyzer Downtime

From:

Generated:

07/01/2021 00:00

10/18/2021 10:44

To:

09/30/2021 23:59

Facility Name:

Location:

Description:

Cleveland-Cliffs Minorca Mine Inc

5950 Old Hwy 53, Virginia, MN 55792

Indurating Furnace (EU 026)



CMS Data from:

EDS Data from:

Emission Limitation:

Monitor Manufacturer, Model No., & Serial:

Date of Latest CMS Certification or Audit:

Operating time for CMS:

SV15_NOx_Ppm_1H

N/A

No limits apply to individual stacks.

TAPI, T200H, 250

7/29/2021

1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV015 SO2 Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV15_SO2_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T100H, 142
Date of Latest CMS Certification or Audit: 7/29/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
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1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV016 Flow Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV16_StackFlow_scfh_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: Sic Flowsic, 100H, 13088520
Date of Latest CMS Certification or Audit: 7/28/2021 (via NOx RATA)
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV016 NOx Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV16_NOx_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T200H, 249
Date of Latest CMS Certification or Audit: 7/28/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
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1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV016 SO2 Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV16_SO2_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T100H, 144
Date of Latest CMS Certification or Audit: 7/28/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV017 Flow Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV17_StackFlow_scfh_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: Sic Flowsic, 100H, 13078504
Date of Latest CMS Certification or Audit: 7/29/2021 (via NOx RATA)
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV017 NOx Analyzer Downtime

From: 07/01/2021 00:00 **To:** 09/30/2021 23:59 **Facility Name:** Cleveland-Cliffs Minorca Mine Inc
Generated: 10/18/2021 10:44 **Location:** 5950 Old Hwy 53, Virginia, MN 55792
Description: Indurating Furnace (EU 026)



CMS Data from: SV17_NOx_Ppm_1H
EDS Data from: N/A
Emission Limitation: No limits apply to individual stacks.
Monitor Manufacturer, Model No., & Serial: TAPI, T200H, 251
Date of Latest CMS Certification or Audit: 7/29/2021
Operating time for CMS: 1,953.00 Hour(s)

CMS Performance Summary	
1. CMS downtime in reporting period due to:	
a. Monitor equipment malfunctions	0
b. Non-Monitor equipment malfunctions	0
c. Quality assurance calibration	0
d. Other known causes	0
e. Unknown causes	0
2. Total CMS Downtime	0
3. Total Downtime as a percentage of operating time	0.00
4. Total Availability as a percentage of operating time	100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Quarterly Excess Emissions and Monitoring System Performance Report

SV017 SO2 Analyzer Downtime

From:

07/01/2021 00:00

To:

09/30/2021 23:59

Facility Name:

Cleveland-Cliffs Minorca Mine Inc

Generated:

10/18/2021 10:44

Location:

5950 Old Hwy 53, Virginia, MN 55792

Description:

Indurating Furnace (EU 026)



CMS Data from:

SV17_SO2_Ppm_1H

EDS Data from:

N/A

Emission Limitation:

No limits apply to individual stacks.

Monitor Manufacturer, Model No., & Serial:

TAPI, T100H, 145

Date of Latest CMS Certification or Audit:

7/29/2021

Operating time for CMS:

1,953.00 Hour(s)

CMS Performance Summary		
1. CMS downtime in reporting period due to:		
a. Monitor equipment malfunctions		0
b. Non-Monitor equipment malfunctions		0
c. Quality assurance calibration		0
d. Other known causes		0
e. Unknown causes		0
2. Total CMS Downtime		0
3. Total Downtime as a percentage of operating time		0.00
4. Total Availability as a percentage of operating time		100.00

There were no periods of monitor downtime during this reporting period except for the daily zero and span checks.

There were no changes in continuous monitoring systems, processes, or controls that would have invalidated the CEMS certification test or adversely affected its ability to accurately measure the emissions from the indurating furnace during this reporting period.

Cleveland-Cliffs
Minorca Mine Inc.
Virginia, Minnesota

Barr Engineering Co.
August 31, 2021

TABLE 1

RATA RESULTS SUMMARY
Indurating Furnace Stack A (SV014)
July 28, 2021

Sulfur Dioxide Emission Rate Relative Accuracy		Calculated using the Reference Method					Relative Accuracy Limit			20%
SO₂, lb/hr	Run 1 0855-0915	Run 2 0916-0936	Run 3 0937-0957	Run 4 1020-1040	Run 5 1041-1101	Run 6 1102-1122	Run 7 1138-1158	Run 8 1159-1219	Run 9 1220-1240	
Reference Method lb/hr	17.8	18.3	19.1	18.7	18.5	19.1	19.2	19.6	19.5	
CEM lb/hr	16.7	17.0	17.6	17.4	17.5	18.3	18.6	18.7	18.6	
Difference	-1.0	-1.4	-1.5	-1.2	-1.0	-0.7	-0.6	-0.9	-0.9	
Average Difference	-1.0	Standard Deviation of the Differences				0.3	Relative Accuracy			6.7%
Confidence Coefficient	0.2	Average Reference Method, SO ₂ lb/hr				18.9	Average CEM, SO ₂ lb/hr			17.8

Oxides of Nitrogen Emission Rate Relative Accuracy		Calculated using the Applicable Standard					Relative Accuracy Limit			10%
NO_x, lb/hr	Run 1 0855-0915	Run 2 0916-0936	Run 3 0937-0957	Run 4 1020-1040	Run 5 1041-1101	Run 6 1102-1122	Run 7 1138-1158	Run 8 1159-1219	Run 9 1220-1240	
Reference Method lb/hr	55.5	56.4	55.0	53.4	55.6	54.8	55.2	55.2	56.1	
CEM lb/hr	49.9	50.1	47.9	47.6	49.2	49.6	50.6	50.0	50.0	
Difference	-5.6	-6.3	-7.1	-5.8	-6.4	-5.2	-4.6	-5.2	-6.1	
Average Difference	-5.8	Standard Deviation of the Differences				0.8	Relative Accuracy			0.6%
Confidence Coefficient	0.6	Applicable Standard				1088.0	Average CEM, lb/hr			49.4

TABLE 2

RATA RESULTS SUMMARY
Indurating Furnace Stack B (SV015)
July 29, 2021

Sulfur Dioxide Emission Rate Relative Accuracy		Calculated using the Reference Method					Relative Accuracy Limit			20%
SO ₂ , lb/hr	Run 1 0800-0820	Run 2 0821-0841	Run 3 0842-0902	Run 4 0925-0945	Run 5 0946-1006	Run 6 1035-1055	Run 7 1117-1137	Run 8 1138-1158	Run 9 1159-1219	
Reference Method lb/hr	12.2	13.5	13.4	12.8	14.7	13.3	14.6	15.6	14.6	
CEM lb/hr	11.8	12.9	12.9	12.6	14.6	12.8	14.2	15.2	14.2	
Difference	-0.4	-0.6	-0.6	-0.2	-0.1	-0.5	-0.3	-0.4	-0.4	
Average Difference	-0.4	Standard Deviation of the Differences				0.2	Relative Accuracy			3.9%
Confidence Coefficient	0.1	Average Reference Method, SO ₂ lb/hr				13.9	Average CEM, SO ₂ lb/hr			13.5

Oxides of Nitrogen Emission Rate Relative Accuracy		Calculated using the Applicable Standard					Relative Accuracy Limit			10%
NO _x , lb/hr	Run 1 0800-0820	Run 2 0821-0841	Run 3 0842-0902	Run 4 0925-0945	Run 5 0946-1006	Run 6 1035-1055	Run 7 1117-1137	Run 8 1138-1158	Run 9 1159-1219	
Reference Method lb/hr	63.3	61.2	62.0	60.2	57.6	62.4	61.2	61.6	62.5	
CEM lb/hr	60.6	58.4	59.8	58.9	56.5	60.8	59.8	59.9	60.9	
Difference	-2.7	-2.8	-2.2	-1.3	-1.1	-1.6	-1.4	-1.7	-1.6	
Average Difference	-1.8	Standard Deviation of the Differences				0.6	Relative Accuracy			0.2%
Confidence Coefficient	0.5	Applicable Standard				1088.0	Average CEM, lb/hr			59.5

Cleveland-Cliffs
Minorca Mine Inc.
Virginia, Minnesota

Barr Engineering Co.
August 31, 2021

TABLE 3

RATA RESULTS SUMMARY
Indurating Furnace Stack C (SV016)
July 28, 2021

Sulfur Dioxide Emission Rate Relative Accuracy		Calculated using the Reference Method					Relative Accuracy Limit			20%
SO ₂ , lb/hr	Run 1 0855-0915	Run 2 0916-0936	Run 3 0937-0957	Run 4 1020-1040	Run 5 1041-1101	Run 6 1102-1122	Run 7 1137-1157	Run 8 1158-1218	Run 9 1219-1239	
Reference Method lb/hr	11.5	12.5	13.3	13.4	13.1	14.0	14.9	14.4	14.6	
CEM lb/hr	12.9	13.2	13.8	13.9	13.9	14.6	14.6	15.0	14.8	
Difference	1.3	0.7	0.5	0.5	0.8	0.6	-0.3	0.5	0.2	
Average Difference	0.5	Standard Deviation of the Differences				0.4	Relative Accuracy			6.5%
Confidence Coefficient	0.3	Average Reference Method, SO ₂ lb/hr				13.5	Average CEM, SO ₂ lb/hr			14.1

Oxides of Nitrogen Emission Rate Relative Accuracy		Calculated using the Applicable Standard					Relative Accuracy Limit			10%
NO _x , lb/hr	Run 1 0855-0915	Run 2 0916-0936	Run 3 0937-0957	Run 4 1020-1040	Run 5 1041-1101	Run 6 1102-1122	Run 7 1137-1157	Run 8 1158-1218	Run 9 1219-1239	
Reference Method lb/hr	85.4	86.3	83.8	83.4	86.5	87.5	88.8	88.6	89.0	
CEM lb/hr	74.2	74.8	71.9	71.9	75.1	75.4	75.8	76.3	76.8	
Difference	-11.2	-11.5	-11.9	-11.5	-11.4	-12.1	-13.0	-12.3	-12.2	
Average Difference	-11.9	Standard Deviation of the Differences				0.5	Relative Accuracy			1.1%
Confidence Coefficient	0.4	Applicable Standard				1088.0	Average CEM, lb/hr			74.7

Cleveland-Cliffs
 Minorca Mine Inc.
 Virginia, Minnesota

Barr Engineering Co.
 August 31, 2021

TABLE 4

RATA RESULTS SUMMARY
 Indurating Furnace Stack D (SV017)
 July 29, 2021

Sulfur Dioxide Emission Rate Relative Accuracy		Calculated using the Reference Method					Relative Accuracy Limit			20%
SO₂, lb/hr	Run 1 0800-0820	Run 2 0821-0841	Run 3 0842-0902	Run 4 0925-0945	Run 5 0946-1006	Run 6 1035-1055	Run 7 1117-1137	Run 8 1138-1158	Run 9 1159-1219	
Reference Method lb/hr	8.6	9.9	9.8	9.5	11.9	10.1	11.2	11.6	11.4	
CEM lb/hr	9.5	10.5	10.3	10.3	13.1	10.1	11.7	12.5	12.0	
Difference	0.9	0.5	0.5	0.8	1.2	0.0	0.5	0.9	0.6	
Average Difference	0.7	Standard Deviation of the Differences				0.3	Relative Accuracy			8.8%
Confidence Coefficient	0.3	Average Reference Method, SO ₂ lb/hr				10.4	Average CEM, SO ₂ lb/hr			11.1

Oxides of Nitrogen Emission Rate Relative Accuracy		Calculated using the Applicable Standard					Relative Accuracy Limit			10%
NO_x, lb/hr	Run 1 0800-0820	Run 2 0821-0841	Run 3 0842-0902	Run 4 0925-0945	Run 5 0946-1006	Run 6 1035-1055	Run 7 1117-1137	Run 8 1138-1158	Run 9 1159-1219	
Reference Method lb/hr	126.6	124.5	124.5	124.3	118.9	126.2	125.0	125.3	128.1	
CEM lb/hr	114.4	111.7	113.7	113.1	109.9	116.3	115.4	115.6	118.4	
Difference	-12.2	-12.8	-10.8	-11.2	-9.0	-9.9	-9.6	-9.7	-9.7	
Average Difference	-10.5	Standard Deviation of the Differences				1.3	Relative Accuracy			1.1%
Confidence Coefficient	1.0	Applicable Standard				1088.0	Average CEM, lb/hr			114.3